I/WE CLAIM:

1.   1. A method for transmitting information from a computer to a server comprising

2 the steps of:

3   (a) assigning a Mobile Internet protocol (IP) address to customer premise

4 equipment (CPE) associated with the computer;

5   (b) registering the Mobile IP address with a Mobile IP home agent associated with

6 a home network for the assigned Mobile IP address;

7   (c) initiating a point-to-point protocol (PPP) session from the computer to a L2TP

8 access concentrator (LAC) associated with the CPE;

9   (d) encapsulating IP data from the computer into PPP frames and sending it to

10 the LAC;

11   (e) encapsulating the PPP frames into L2TP packets at the LAC;

12   (f) directing the L2TP packets to a Mobile foreign agent associated with a mobile

13 base station via mobile communications;

14   (g) further encapsulating the L2TP packets at the Mobile IP foreign agent into

15 Mobile IP packets;

16   (h) transmitting the encapsulated Mobile IP packets to the Mobile IP home agent

17 associated with a base station;

18   (i) unencapsulating the transmitted Mobile IP packets at the Mobile IP home

19 agent into L2TP packets;

20   (j) forwarding the unencapsulated L2TP packets to the L2TP network server LNS

21 associated with the Mobile home agent;

22   (k) unencapsulating the forwarded L2TP packets at the LNS into PPP frames; and

23   (l) forwarding the unencapsulated PPP frames to the server;

24   (m) sending IP packets intended for the computer from the server to the LNS

25 where they are encapsulated into PPP frames, further encapsulating the PPP frames into L2TP

26 packets;

27   (n) sending the encapsulated L2TP packets to the Mobile home agent where they

28 are encapsulated as Mobile IP packets;

29   (o)   directing the Mobile IP packets from the Mobile home agent to the foreign

30   agent associated with the registered CPE of the destination computer;

31   (p)   unencapsulating the Mobile IP packets at the foreign agent to uncover L2TP

32   encapsulated PPP frames;

33   (q)   sending the encapsulated PPP frames to the destination CPE and having the

34   LAC associated with the CPE unencapsulate the L2TP packets into PPP frames; and

35   (r)   sending the PPP frames to the computer.

1   2.   The method of claim 1 wherein movement of the PPP session is transparent

2   to the computer and the server.

1   3.   The method of claim 1 wherein movement of the PPP session is transparent

2   to the LAC and the LNS.

1   4.   The method of claim 1 further comprising the step of: (s) determining whether

2   the CPE detects a new base station.

1   5.   The method of claim 4 further comprising the steps of:

2   if a new base station is detected in step (s),

3   (t)   re-registering with the Mobile IP home agent via a new Mobile IP foreign

4   agent associated with the new base station;

5   (u)   acknowledging the re-registering; and

6   (v)   transmitting the L2TP packets from the LNS to the LAC via the Mobile IP

7   home agent to the new Mobile IP foreign agent.

1   6.   The method of claim 5 wherein step (t) further comprises informing the

2   Mobile IP home agent of a new location of the CPE.

1   7.   The method of claim 5 wherein the steps (t) and (u) are transparent to the

2   computer and the server.

1   8.   The method of claim 1 wherein the PPP session utilizes PPPoE (point-to-point
2   protocol over Ethernet) for transporting the PPP frames over an Ethernet network.

1   9.   A system for transmitting information from a computer to a server, the system
2   comprising:
3   customer premise equipment (CPE) associated with the computer;
4   said CPE having a Mobile Internet protocol (IP) address assigned thereto;
5   a Mobile IP home agent associated with a home network for the assigned Mobile IP
6   address, wherein the Mobile IP home agent is registered with the Mobile IP address;
7   a L2TP access concentrator (LAC) associated with the CPE which is capable of
8   establishing a point-to-point protocol (PPP) session from the computer to the L2TP access
9   concentrator (LAC);
10   an L2TP network server (LNS) associated with the server and being capable of
11   establishing an L2TP (layer 2 tunneling protocol) session between it and the LAC, wherein IP data
12   are encapsulated into PPP frames and then into L2TP packets at the LNS and the encapsulated L2TP
13   packets are sent to the LAC, and the L2TP packets being intercepted by the Mobile IP home agent
14   where they are encapsulated in Mobile IP packets;
15   a Mobile IP foreign agent associated with a base station wherein the Mobile IP
16   packets are unencapsulated at the Mobile IP foreign agent into L2TP packets and the unencapsulated
17   L2TP packets are forwarded to the LAC via the base station, the L2TP packets forwarded to the LAC
18   being unencapsulated by the LAC into PPP frames and the unencapsulated PPP frames being
19   forwarded by the LAC to the computer.

1   10.   The system of claim 9 wherein movement of the PPP session is transparent
2   to the computer and the server.

1   11.   The system of claim 9 wherein movement of the PPP session is transparent

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2   to the LAC and the LNS.

1   12.   The system of claim 9 wherein the CPE detects whether it is within range of

2   a new base station.

1   13.   The system of claim 12 further wherein:

2   if a new base station is detected, the CPE re-registers with the Mobile IP home agent

3   informing it of a new Mobile IP foreign agent associated with the new base station, and

4   the Mobile IP home agent transmits the L2TP packets from the LNS to the LAC via

5   the new Mobile IP foreign agent.

1   14.   The system of claim 13 wherein the CPE notifies the Mobile IP home agent

2   of a new location of the CPE.

1   15.   The system of claim 13 wherein the Mobile IP Mobile Node functionality is

2   re-registered and acknowledged transparently to the computer and the server.

1   16.   The system of claim 9 wherein the PPP session utilizes PPPoE (point-to-point

2   protocol over Ethernet) for transporting the PPP frames over an Ethernet network between the

3   computer and the CPE.

1   17.   The system of claim 9 wherein the CPE comprises a Mobile IP mobile node

2   functionality and LAC (L2TP access concentrator) functionality.

1   18.   A system for transmitting information from a computer to a server, the system

2   comprising:

3   a computer network;

4   a L2TP access concentrator (LAC);

5   a user device connected to the LAC via PPP (point-to-point protocol) for accessing

6   the computer;

7   a customer premise equipment (CPE) associated with the user device network and

8   having a Mobile Internet protocol (IP) address assigned thereto;

9   a home network with which the Mobile IP address is registered;

10   a Mobile IP mobile node;

11   a Mobile IP foreign agent associated with a base station wherein the Mobile IP

12   foreign agent is registered by the Mobile IP mobile node to a Mobile IP home agent associated with

13   the home network wherein IP packets destined to the Mobile IP mobile node are encapsulated and

14   forwarded to the registered Mobile IP foreign agent; and

15   an LNS (L2TP network server);

16   wherein a PPP (point-to-point protocol) session is terminated from the computer; and

17   wherein an L2TP (layer 2 tunneling protocol) tunnel is terminated from the LAC.

1   19.   The system of claim 18 wherein the LNS is associated with L2TP tunnels

2   initiated at other LACs and is a termination point of the L2TP tunnels and PPP sessions contained

3   within the L2TP tunnels.

1   20.   The system of claim 18 wherein it is determined when the CPE is within range

2   of a new base station.

1   21.   The system of claim 20 wherein, if it is determined that the CPE is within the

2   range of the new base station, the CPE is re-registered with the Mobile IP home agent via a new

3   Mobile IP foreign agent associated with the new base station.

1   22.   The system of claim 21 wherein the Mobile IP home agent is informed of a

2   new location of the CPE.

1   23.   The system of claim 21 wherein, upon acknowledgment of the re-registered

2   CPE, the Mobile IP home agent forwards the IP packets destined for the Mobile IP address, to the

3   new Mobile IP foreign agent.

1   24.   The system of claim 21 wherein the CPE is re-registered transparently to the

2   computer and the server.

1   25.   The system of claim 18 wherein the CPE comprises a Mobile IP mobile node

2   functionality and LAC (L2TP access concentrator) functionality.

1   26.   The system of claim 18 wherein the CPE is co-located within the user device.

1   27.   The system of claim 18 wherein the CPE is separately located from the user

2   device.

1   28.   The system of claim 18 wherein the user device is selected from a group

2   consisting of a general purpose computer, personal computer (PC), Macintosh, Unix, personal digital

3   assistant (PDA), mobile telephone.

1   29.   The system of claim 18 wherein movement of the PPP session is transparent

2   to the computer and the server.

1   30.   The system of claim 18 wherein movement of the PPP session is transparent

2   to the LAC and the LNS.

1   31.   A method for transmitting information from a computer to a server comprising

2   the steps of:

3   (a)   registering a Mobile IP address, for customer premise equipment (CPE)

4   associated with the computer, at a Mobile IP home agent associated with a home network for the

5   assigned Mobile IP address;

6   (b)   initiating a point-to-point protocol (PPP) session from the computer to a L2TP

7   access concentrator (LAC) associated with the CPE;

8   (c)   initiating layer 2 tunneling protocol (L2TP) session between the LAC and an

9   L2TP network server (LNS) associated with the server;

10   (d)   encapsulating data from the computer into PPP frames at the computer;

11   (e)   directing the PPP frame data to the LAC where it is encapsulated as L2TP

12   packets;

13   (f)   sending the L2TP packets to a foreign agent at a mobile base station,

14   (g)   encapsulating the L2TP packets at the foreign agent into Mobile IP packets;

15   (h)   transmitting the encapsulated Mobile IP packets to the Mobile IP home agent

16   where they are unencapsulated into L2TP packets;

17   (i)   forwarding the L2TP packets to the LNS;

18   (j)   unencapsulating the forwarded L2TP packets at the LNS into PPP frames; and

19   (k)   terminating the PPP session, unencapsulating the PPP frames, and forwarding

20   the data from the computer in substep (d) to the server.

1   32.   The method of claim 31 further comprising the steps of:

2   (l)   sending PPP frames intended for the computer from the server to the LNS

3   where they are encapsulated into L2TP packets;

4   (m)   sending the encapsulated PPP frames to the Mobile home agent where they

5   are encapsulated as Mobile IP packets;

6   (n)   directing the Mobile IP packets from the Mobile home agent to the foreign

7   agent associated with the registered CPE of the destination computer;

8   (o)   unencapsulating the Mobile IP packets at the foreign agent to uncover L2TP

9   encapsulated PPP frames;

10   (p)   sending the encapsulated PPP frames to the destination CPE and having the

11   LAC associated with the CPE unencapsulate the L2TP packets into PPP frames; and

12   (q)   sending the PPP frames to the computer.

1   33.   The method of claim 31 wherein movement of the PPP session is transparent

2   to the computer and the server.

1   34.   The method of claim 31 wherein movement of the PPP session is transparent
2   to the LAC and the LNS.

1   35.   The method of claim 31 further comprising the step of: (r) determining
2   whether the CPE detects a new base station.

1   36.   The method of claim 35 further comprising the steps of:
2   if a new base station is detected in step (r),
3   (s)   re-registering with the Mobile IP home agent via a new Mobile IP foreign
4   agent associated with the new base station;
5   (t)   acknowledging the re-registering; and
6   (u)   transmitting the L2TP packets from the LNS to the LAC via the Mobile IP
7   home agent to the new Mobile IP foreign agent.

1   37.   The method of claim 36 wherein step (s) further comprises informing the
2   Mobile IP home agent of a new location of the CPE.

1   38.   The method of claim 36 wherein the steps (s) and (t) are transparent to the
2   computer and the server.

1   39.   The method of claim 31 wherein the PPP session utilizes PPPoE (point-to-
2   point protocol over Ethernet) for transporting the PPP frames over an Ethernet network.